

## THAT WHICH IS CLAIMED IS:

1. A wireless communication network comprising:  
a plurality of mobile nodes each comprising a transceiver, a phased array antenna connected to said transceiver, and a controller connected to said transceiver for

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substantive

scheduling a respective semi-permanent time slot for each time frame to establish a communication link with each neighboring mobile node and leaving at least one available time slot in each time frame, each time frame having up to N semi-permanent time slots and at least  $2N-1$  available time slots,  
scheduling the at least one available time slot to also serve the communication link with a neighboring mobile node based upon link communications demand, and  
aiming said phased array antenna toward each neighboring mobile node during communication therewith.

2. A wireless communication network according to Claim 1, wherein said controller prioritizes the communication links and drops one of the communication links based upon the prioritization for making available  
5 a semi-permanent time slot for establishing a communication link with a new neighboring mobile node.

3. ~~A wireless communication network according~~  
to Claim 1, wherein said controller prioritizes the  
communication links and schedules the at least one  
available time slot based upon the prioritization.

4. A wireless communication network according  
to Claim 1, wherein said controller schedules one of the  
semi-permanent time slots as an available time slot if a  
number of the communication links is less than N.

5. A wireless communication network according  
to Claim 4, wherein said controller reschedules the  
demand assigned time slot back to a semi-permanent time  
slot if the number of the communication links is to be  
5 equal to N.

6. A wireless communication network according  
to Claim 1, wherein each communication link is formed by  
an initiating mobile node and a receiving mobile node,  
and wherein said initiating mobile node transmits a list  
5 of available semi-permanent time slots to said receiving  
mobile node.

7. A wireless communication network according  
to Claim 6, wherein said receiving mobile node transmits  
selection of one of the semi-permanent time slots to said  
initiating mobile node.

8. A wireless communication network according  
to Claim 7, wherein said initiating mobile node confirms

selection of the selected semi-permanent time slot to said receiving mobile node.

9. A wireless communication network according to Claim 1, wherein each mobile node further comprises an omni-directional antenna connected to said transceiver for exchanging positional information with other  
5 neighboring mobile nodes.

10. A wireless communication network according to Claim 1, wherein each mobile node comprises a plurality of transceivers so that said phased array antenna simultaneously generates multiple antenna beams;  
5 and wherein said controller aims said phased array antenna to multiple neighboring mobile nodes within a scheduled semi-permanent time slot.

11. A wireless communication network according to Claim 10, wherein the multiple antenna beams are generated on different frequencies.

12. A wireless communication network according to Claim 1, wherein a plurality of communication links are established within a scheduled semi-permanent time slot, with each communication link including a different  
5 pair of neighboring mobile nodes.

13. A wireless communication network comprising:  
a plurality of mobile nodes each comprising a

transceiver, a directional antenna connected to said  
 5 transceiver, and a controller connected to said  
 transceiver for

10 scheduling a respective semi-  
 permanent time slot for each time frame to  
 establish a communication link with each  
 neighboring mobile node and leaving at least  
 one available time slot in each time frame,  
 scheduling the at least one available  
 time slot to also serve the communication  
 link with a neighboring mobile node based  
 15 upon link communications demand, and  
 aiming said directional antenna toward each  
 neighboring mobile node during communication  
 therewith.

14. A wireless communication network  
 according to Claim 13, wherein each time frame has up to  
 N semi-permanent time slots and at least  $2N-1$  available  
 time slots.

15. A wireless communication network according  
 to Claim 13, wherein said controller prioritizes the  
 communication links and drops one of the communication  
 links based upon the prioritization for making available  
 5 a semi-permanent time slot for establishing a  
 communication link with a new neighboring mobile node.

16. A wireless communication network according  
 to Claim 13, wherein said controller prioritizes the

communication links and schedules the at least one available time slot based upon the prioritization.

17. A wireless communication network according to Claim 13, wherein said controller schedules one of the semi-permanent time slots as an available time slot if a number of the communication links is less than N.

18. A wireless communication network according to Claim 17, wherein said controller reschedules the demand assigned time slot back to a semi-permanent time slot if the number of the communication links is to be equal to N.

19. A wireless communication network according to Claim 13, wherein each communication link is formed by an initiating mobile node and a receiving mobile node, and wherein said initiating mobile node transmits a list of available semi-permanent time slots to said receiving mobile node.

20. A wireless communication network according to Claim 19, wherein said receiving mobile node transmits selection of one of the semi-permanent time slots to said initiating mobile node.

21. A wireless communication network according to Claim 20, wherein said initiating mobile node confirms selection of the selected semi-permanent time slot to said receiving mobile node.

22. A wireless communication network according to Claim 13, wherein each mobile node further comprises an omni-directional antenna connected to said transceiver for exchanging positional information with other  
5 neighboring mobile nodes.

23. A wireless communication network according to Claim 13, wherein said directional antenna comprises a phased array antenna.

24. A wireless communication network according to Claim 23, wherein each mobile node comprises a plurality of transceivers so that said phased array antenna simultaneously generates multiple antenna beams;  
5 and wherein said controller aims said phased array antenna to multiple neighboring mobile nodes within a scheduled semi-permanent time slot.

25. A wireless communication network according to Claim 24, wherein the multiple antenna beams are generated on different frequencies.

26. A wireless communication network according to Claim 13, wherein a plurality of communication links are established within a scheduled semi-permanent time slot, with each communication link including a different  
5 pair of neighboring mobile nodes.

27. A method for establishing communication links for a plurality of mobile nodes, each mobile node

comprising a transceiver, a phased array antenna  
 connected to the transceiver, and a controller connected  
 5 to the transceiver, the method comprising for each mobile  
 node:

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 scheduling a respective semi-permanent time  
 slot for each time frame to establish a communication  
 link with a neighboring mobile node and leaving at least  
 10 one available time slot in each time frame;

scheduling the at least one available time slot  
 to also serve the communication link with a neighboring  
 mobile node based upon link communications demand; and

aiming the phased array antenna toward each  
 15 neighboring mobile node during communication therewith.

28. A method according to Claim 27, wherein  
 each time frame has up to  $N$  semi-permanent time slots and  
 at least  $2N-1$  available time slots.

29. A method according to Claim 27, wherein  
 each node prioritizes the communication links and drops  
 one of the communication links based upon the  
 prioritization for making available a semi-permanent time  
 5 slot for establishing a communication link with a new  
 neighboring mobile node.

30. A method according to Claim 27, wherein  
 each node prioritizes the communication links and  
 schedules the at least one available time slot based upon  
 the prioritization.

31. A method according to Claim 27, further comprising scheduling one of the semi-permanent time slots as an available time slot if a number of the communication links is less than N.

32. A method according to Claim 31, further comprising rescheduling the demand assigned time slot back to a semi-permanent time slot if the number of the communication links is to be equal to N.

33. A method according to Claim 27, wherein each communication link is formed by an initiating mobile node and a receiving mobile node, and wherein the initiating mobile node transmits a list of available  
5 semi-permanent time slots to the receiving mobile node.

34. A method according to Claim 33, wherein the receiving mobile node transmits selection of one of the semi-permanent time slots to the initiating mobile node.

35. A method according to Claim 34, wherein the initiating mobile node confirms selection of the selected semi-permanent time slot to the receiving mobile node.

36. A method according to Claim 27, wherein each mobile node further comprises an omni-directional antenna connected to the transceiver, the method further comprising exchanging positional information with other



5 neighboring mobile nodes.

37. A method according to Claim 27, wherein each mobile node comprises a plurality of transceivers so that the phased array antenna simultaneously generates multiple antenna beams; and wherein aiming comprises  
 5 aiming the phased array antenna to multiple neighboring mobile nodes within a scheduled semi-permanent time slot.

38. A method according to Claim 37, wherein the multiple antenna beams are generated on different frequencies.

39. A method according to Claim 27, wherein a plurality of communication links are established within a scheduled semi-permanent time slot, with each communication link including a different pair of  
 5 neighboring mobile nodes.

40. A method for establishing communication links for a plurality of mobile nodes, each mobile node comprising a transceiver, a directional antenna connected to the transceiver, and a controller connected to the  
 5 transceiver, the method comprising for each mobile node:  
 scheduling a respective semi-permanent time slot for each time frame to establish a communication link with a neighboring mobile node and leaving at least one available time slot in each time frame, each time  
 10 frame having up to N semi-permanent time slots and at  
~~least 2N-1 available time slots;~~

15 scheduling the at least one available time slot  
to also serve the communication link with a neighboring  
mobile node based upon link communications demand; and  
aiming the directional antenna toward each  
neighboring mobile node during communication therewith.

41. A method according to Claim 40, wherein  
the directional antenna comprises a phased array antenna.

5 42. A method according to Claim 40, wherein  
each node prioritizes the communication links and drops  
one of the communication links based upon the  
prioritization for making available a semi-permanent time  
slot for establishing a communication link with a new  
neighboring mobile node.

43. A method according to Claim 40, wherein  
each node prioritizes the communication links and  
schedules the at least one available time slot based upon  
the prioritization.

44. A method according to Claim 40, further  
comprising scheduling one of the semi-permanent time  
slots as an available time slot if a number of the  
communication links is less than N.

45. A method according to Claim 44, further  
comprising rescheduling the demand assigned time slot  
back to a semi-permanent time slot if the number of the  
~~communication links is to be equal to N.~~

46. A method according to Claim 40, wherein each communication link is formed by an initiating mobile node and a receiving mobile node, and wherein the initiating mobile node transmits a list of available  
5 semi-permanent time slots to the receiving mobile node.

47. A method according to Claim 46, wherein the receiving mobile node transmits selection of one of the semi-permanent time slots to the initiating mobile node.

48. A method according to Claim 47, wherein the initiating mobile node confirms selection of the selected semi-permanent time slot to the receiving mobile node.

49. A method according to Claim 40, wherein each mobile node further comprises an omni-directional antenna connected to the transceiver, the method further comprising exchanging positional information with other  
5 neighboring mobile nodes.

50. A method according to Claim 41, wherein each mobile node comprises a plurality of transceivers so that the phased array antenna simultaneously generates multiple antenna beams; and wherein aiming comprises  
5 aiming the phased array antenna to multiple neighboring mobile nodes within a scheduled semi-permanent time slot.

51. A method according to Claim 50, wherein

the multiple antenna beams are generated on different frequencies.

52. A method according to Claim 40, wherein a plurality of communication links are established within a scheduled semi-permanent time slot, with each communication link including a different pair of  
5 ~~neighboring mobile nodes.~~

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